

WHAT IS CLAIMED IS:

1. A tracking error signal generation device, comprising:
  - a splitting and convergence section for splitting an optical beam into a main beam and a sub beam and converging the main beam and the sub beam onto an optical disc;
  - a two-portion main beam detection section for detecting the main beam reflected by the optical disc;
  - a main beam push-pull signal generation section for generating a main beam push-pull signal based on a differential signal which is output from the two-portion main beam detection section;
  - a two-portion sub beam detection section for detecting the sub beam reflected by the optical disc;
  - a sub beam push-pull signal generation section for generating a sub beam push-pull signal based on a differential signal which is output from the two-portion sub beam detection section;
  - a displacement amount detection section for detecting a displacement amount of the main beam push-pull signal from a reference value based on the main beam push-pull signal and the sub beam push-pull signal; and
  - a tracking error signal generation section for generating a tracking error signal by correcting either the main beam push-pull signal or the sub beam push-pull signal based on the displacement amount detected by the displacement amount detection section.
2. A tracking error signal generation device according to claim 1, wherein the displacement amount detection section adds the main beam push-pull signal and the sub beam push-pull signal and detects the addition result as a displacement

amount of the main beam push-pull signal from the reference value.

3. A tracking error signal generation device according to claim 1, wherein the tracking error signal generation section generates a tracking error signal by correcting the main beam push-pull signal based on a low frequency component of a signal representing the displacement amount detected by the displacement amount detection section.

4. A tracking error signal generation device according to claim 1, wherein:

the optical disc has at least one track;

the splitting and convergence section includes an objective lens for converging the main beam and the sub beam onto the optical disc;

the tracking error signal generation device further includes a driving section for driving an objective lens displacement section for displacing the objective lens in a direction substantially perpendicular to the at least one track by outputting a driving signal to the objective lens displacement section;

the displacement amount detection section includes a first objective lens displacement amount detection section for adding the main beam push-pull signal and the sub beam push-pull signal and detecting the addition result as an objective lens displacement amount, and a second objective lens displacement amount detection section for detecting an objective lens displacement amount based on the driving signal; and

the tracking error signal generation section generates the tracking error signal by correcting the main beam push-pull signal based on a low frequency component

of a signal showing the objective lens displacement amount detected by the first objective lens displacement amount detection section and a high frequency component of a signal showing the objective lens displacement amount detected by the second objective lens displacement amount detection section.

5. A tracking error signal generation device according to claim 4, wherein the second objective lens displacement amount detection section includes an equivalent filter having a characteristic which is equivalent to a characteristic of the objective lens displacement section and detecting the objective lens displacement amount based on the driving signal.

6. An optical disc apparatus comprising:

- a tracking error signal generation device including:

- a splitting and convergence section for splitting an optical beam into a main beam and a sub beam and converging the main beam and the sub beam onto an optical disc having at least one track, the splitting and convergence section including an objective lens for converging the main beam and the sub beam onto the optical disc,

- a two-portion main beam detection section for detecting the main beam reflected by the optical disc,

- a main beam push-pull signal generation section for generating a main beam push-pull signal based on a differential signal which is output from the two-portion main beam detection section,

- a two-portion sub beam detection section for detecting the sub beam reflected by the optical disc,

- a sub beam push-pull signal generation section for generating a sub beam push-pull signal based on a differential

signal which is output from the two-portion sub beam detection section,

a displacement amount detection section for detecting a displacement amount of the main beam push-pull signal from a reference value based on the main beam push-pull signal and the sub beam push-pull signal, and

a tracking error signal generation section for generating a tracking error signal by correcting either the main beam push-pull signal or the sub beam push-pull signal based on the displacement amount detected by the displacement amount detection section;

an objective lens displacement section for displacing the objective lens in a direction substantially perpendicular to the at least one track;

a transfer section for transferring the objective lens displacement section in a direction substantially perpendicular to the at least one track;

a transfer control section for controlling the transfer section based on the displacement amount detected by the displacement amount detection section; and

a tracking control section for controlling the objective lens displacement section based on the tracking error signal.

7. An optical disc apparatus according to claim 6, wherein the tracking error signal generation section further includes a driving section for driving the objective lens displacement section by outputting a driving signal to the objective lens displacement section;

the displacement amount detection section includes a first objective lens displacement amount detection section for adding the main beam push-pull signal and the sub beam push-pull signal and detecting the addition result as an

objective lens displacement amount, and a second objective lens displacement amount detection section for detecting an objective lens displacement amount based on the driving signal;

the tracking error signal generation section generates the tracking error signal by correcting the main beam push-pull signal based on a low frequency component of a signal showing the objective lens displacement amount detected by the first objective lens displacement amount detection section and a high frequency component of a signal showing the objective lens displacement amount detected by the second objective lens displacement amount detection section; and

the transfer control section controls the transfer section based on the low frequency component and the high frequency component.

8. A tracking error signal generation method, comprising the steps of:

splitting an optical beam into a main beam and a sub beam and converging the main beam and the sub beam onto an optical disc;

detecting the main beam reflected by the optical disc by a two-portion main beam detection section;

generating a main beam push-pull signal based on a differential signal which is output from the two-portion main beam detection section;

detecting the sub beam reflected by the optical disc by a two-portion sub beam detection section;

generating a sub beam push-pull signal based on a differential signal which is output from the two-portion sub beam detection section;

detecting a displacement amount of the main beam

push-pull signal from a reference value based on the main beam push-pull signal and the sub beam push-pull signal by a displacement amount detection section; and

generating a tracking error signal by correcting either the main beam push-pull signal or the sub beam push-pull signal based on the displacement amount detected by the displacement amount detection section.

9. A tracking control method, comprising the steps of:

splitting an optical beam into a main beam and a sub beam and converging the main beam and the sub beam onto an optical disc having at least one track by an objective lens;

detecting the main beam reflected by the optical disc by a two-portion main beam detection section;

generating a main beam push-pull signal based on a differential signal which is output from the two-portion main beam detection section;

detecting the sub beam reflected by the optical disc by a two-portion sub beam detection section;

generating a sub beam push-pull signal based on a differential signal which is output from the two-portion sub beam detection section;

detecting a displacement amount of the main beam push-pull signal from a reference value based on the main beam push-pull signal and the sub beam push-pull signal by a displacement amount detection section;

generating a tracking error signal by correcting either the main beam push-pull signal or the sub beam push-pull signal based on the displacement amount detected by the displacement amount detection section;

controlling a transfer section for transferring an objective lens displacement section for displacing the objective lens in a direction substantially perpendicular

to the at least one track based on the displacement amount detected by the displacement amount detection section; and controlling the objective lens displacement section for displacing the objective lens in a direction substantially perpendicular to the at least one track based on the tracking error signal.